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ABSTRACT

This bibliography has been compiled to alert educators to documents about concept development in young children, particularly the development of number concepts found in the ERIC microfiche collection and in journal literature. Abstracts of selected documents were taken from "Research in Education (RIE)" and journal article citations from the "Current Index to Journals in Education (CIJE)". Included are published and unpublished studies focusing on children's acquisition of concept of number, number conservation research, suggestions for practitioners relating to number development, and concept research. Descriptors (subject terms used to characterize the entries) appear after each title and will help the users of this bibliography to identify topics covered in the selections. (Author/WY)

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NUMBER AND CONCEPT DEVELOPMENT: AN ABSTRACT BIBLIOGRAPHY

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Foreword

The Educational Resources Information Center/Early Childhood Education Clearinghouse (ERIC/ECE) is one of a system of 19 clearinghouses sponsored by the United States Office of Education to provide the educational community with information about current research and developments in the field of education. The clearinghouses, each focusing on a specific area of education, (such as early childhood, reading, linguistics, and exceptional children), are located at universities and institutions throughout the United States.

The clearinghouses search systematically to acquire current, significant documents relevant to education. These research studies, speeches, conference proceedings, curriculum guides, and other publications are abstracted, indexed and published in Research in Education (RIE), a monthly journal. RIE is available at libraries, or may be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Another ERIC publication is Current Index to Journals in Education (CIJE), a monthly guide to periodical literature which cites articles in more than 560 journals and magazines in the field of education. Articles are indexed by subject, author, and journal contents, CIJE is available at libraries, or by subscription from CCM Information Corporation, 909 Third Avenue, New York, New York 10022.

The Early Childhood Education Clearinghouse (ERIC/ECE) also distributes a free, current awareness newsletter which singles out RIE and CIJE articles of special interest, and reports on new books, articles, and conferences. The ERIC/ECE Newsletter also describes practical projects currently in progress, as reported by teachers and administrators. For more information, or to receive the Newsletter write: ERIC/ECE Clearinghouse, 805 W. Pennsylvania Avenue, Urbana, Illinois 61801.

Introduction

Young children's concept development has long fascinated psychologists and educators. As they have attempted to understand how children acquire selected concepts, investigators uncover clues to the young child's development of cognitive skills and reasoning processes. One particular area of interest, largely influenced by the investigations of the Swiss psychologist Jean Piaget, is the development of numerical concepts.

This bibliography has been compiled to alert educators to concept development in young children, particularly the development of number concepts. The compilation is made through documents found in the ERIC microfiche collection and in journal literature. Abstracts of selected documents have been taken from Research in Education (RIE) and journal citations from the Current Index to Journals in Education (CIJE). Included are published and unpublished studies focusing on children's acquisition of concept of numbers, number conservation research, practical suggestions for practitioners relating to number development, and concept research.

Major descriptors (marked with an asterisk*) and minor descriptors appear after each title. Descriptors are subject terms which are used in RIE and CIJE to characterize the entries and will help users of this bibliography to identify topics covered in the selections.

Most of the entries are available from the ERIC Document Reproduction Services (EDRS) in either of two forms, microfiche (MF) or hard copy (HC).

Each entry is assigned an ERIC document (ED) identification number, which appears after the title information. Directions for ordering are given on the last page of the bibliography. Journal citations have an (EJ) identification number.

A few titles are not available through EDRS but must be ordered from the publishers, and addresses and prices are listed with each of these citations.

NUMBER AND CONCEPT DEVELOPMENT: AN ABSTRACT BIBLIOGRAPHY

A. Children's Acquisition of Concepts of Numbers

1. General Research

From Microfiche Collection (RIE)

1. Byrne, Mary Ann; Kane, Robert B. Measuring Vocabulary and Symbol Familiarity in the Language of Mathematics. Feb 71, 11p. ED 047 958

   *Concept Formation; *Elementary School Mathematics; *Mathematical Vocabulary; *Secondary School Mathematics; *Reading Research; Mathematics Education

   The procedures and results of a national study to measure the familiarity of 1165 pre-calculus mathematical terms and 154 mathematical symbols are reported. Unique tests of 100 randomly selected mathematical terms as well as unique tests of 36 randomly selected mathematical symbols were generated by a computer. The familiarity of each term was based on the responses of approximately 350 students. The familiarity of each symbol was based on the responses of approximately 250 students. The student sample consisted of approximately 5,500 seventh and eighth graders from 36 schools. The schools were chosen nationwide by a proportionate stratified random sampling plan. Measures of the familiarity of mathematical terms and symbols were established.

2. Greenfield, Patricia Marks. Teaching Mathematical Concepts to Two- and Three-year-olds: Some Experimental Studies. [68], 53p. ED 037 234

   *Concept Teaching; *Preschool Children; *Concept Formation; Mathematical Concepts; Mediation Theory; Geometric Concepts; Discrimination Learning; Verbal Learning; Linguistics; Conceptual Schemes; Abstraction Levels; Semantics

   Experiments conducted to find ways of teaching two and three year olds mathematical concepts were found to have general implications for concept learning. The failure of an initial attempt to teach the concepts "fat" and "skinny" led to a design of instructional procedures that would utilize a concept's name while trying to teach its semantic content. A study of variant procedures used to teach the concept "round" emphasized the importance of verbal representation, and a final experiment, designed to teach "square," was performed to determine whether linguistic or concrete referential contexts were more important. The results supported the linguistic approach to semantics rather than the

psychological: the relation of words to other words appears more crucial than the relation of words to things. Preschool instructional approaches should consider the communicative context of experiences as well as children's direct experience with materials.

3. Resnick, Lauren B.; And Others. Behavior Analysis in Curriculum Design: A Hierarchically Sequenced Introductory Mathematics Curriculum. Dec 70, 82p. ED 047 954

*Curriculum Development; *Elementary School Mathematics; *Number Concepts; *Objectives; *Sequential Learning; Sequential Programs; Instruction; Mathematics Education

A method of systematic behavior analysis is applied to the problem of designing a sequence of learning objectives that will provide an optimal match for the child's natural sequence of acquisition of mathematical skills and concepts. The authors begin by proposing an operational definition of the number concept in the form of a set of behaviors which, taken together, permit the reference that the child has an abstract concept of "number." These are the objectives of the curriculum. Each behavior in the defining set is then subjected to an analysis which identifies hypothesized components of skilled performance and prerequisites for learning these components. On the basis of these analyses, specific sequences of learning objectives are proposed. Finally, a discussion of the ways in which a hierarchically sequenced early learning curriculum can be used in schools is presented. In particular, a "complete mastery model" is described.

4. Tanaka, Masako N.; Chittenden, Edward A. Understanding of Quantitative Concepts in 3 1/2-4 1/2 Year-Old Children. Mar 70, 9p. ED 046 491

*Preschool Children; *Measurement Instruments; *Task Performance; *Evaluation; *Mathematical Concepts; Concept Formation; Research Needs; Developmental Psychology; Psychometrics

This report analyzes the nonverbal performance of 100 children (3 1/2-4 1/2 year old) on tasks of discontinuous quantity. The children are part of a larger group of subjects participating in a longitudinal study of educational and social programs for disadvantaged children currently being conducted by the Educational Testing Service. The purposes of the analysis are: to examine and describe some psychometric properties of measures appropriate for use with very young children; to relate the measures to theory in developmental psychology; and to consider some implications for educational research and practice. The two principal measures are a spontaneous correspondence task and a test of spatial enumeration, with a third supplementary test of counting.

PS 005627

The results suggest the feasibility of measures of quantitative thinking which are less dependent on verbal responses and which attempt to focus on the processes of responding.

From Journal Literatue (CIJE)

1. Ainsworth, Nathan. An Introduction to Sequence: Elementary School Mathematics and Science Enrichment. Arithmetic Teacher, v17 n2, pp143-145, Feb 1970. EJ 033 587

   *Biology; *Mathematical Applications; *Number Concepts; Elementary School Mathematics; Mathematical Enrichment

2. Bartel, Elaine V. Understanding Through Involvement. Arithmetic Teacher, v18 n2, pp91-93, Feb 1971. EJ 033 643

   *Elementary School Mathematics; *Instruction; *Laboratory Techniques; *Number Concepts; *Set Theory; Manipulative Materials

3. Brumfiel, Charles. Mathematical Systems and Their Relationships to the Real World. Arithmetic Teacher, v17 n7, pp563-573, Nov 1970. EJ 030 090

   *Elementary School Mathematics; *Fractions; *Instruction; *Mathematical Models; *Number Concepts; Mathematical Concepts; Mathematical Applications; Mathematics

4. Carman, Robert A.; Carman, Marilyn J. Number Patterns. Arithmetic Teacher, v17 n9, pp637-639, Dec 1970. EJ 031 383

   *Elementary School Mathematics; *Mathematics; *Number Concepts; Arithmetic; Mathematical Enrichment

5. Friedrichs, Ann G.; And Others. Interrelations among Learning and Performance Tasks at the Preschool Level. Developmental Psychology, v4 n2, pp164-172, Mar 1971. EJ 035 361

   *Learning Processes; *Cognitive Processes; *Task Performance; *Problem Solving; *Concept Formation; Serial Learning; Incidental Learning; Paired Associate Learning; Preschool Children

6. Gemma, Mary. Using Parts of Ten. Arithmetic Teacher, v17 n9, pp673-675, Dec 1970. EJ 031 617

*Arithmetic; *Instruction; *Mathematics; *Number Concept; Elementary School Mathematics; Learning

7. Ginsberg, Rose. Number and Color Responses in the Young Child. Developmental Psychology, v7 n2, pp265-273, Apr 1969. EJ 004 773

*Kindergarten Children; *Discrimination Learning; *Number Concepts; *Concept Formation; Stimulus Devices; Reinforcement; Response Mode

Five-year-old kindergarten children were taken through a successive discrimination task to which they could respond correctly either on the basis of number or color. Subsequently they were shifted to a number-relevant, color-irrelevant; or a color-relevant, number-irrelevant task. The results indicated that subjects in the pretransfer trials responded to the number and not to the color dimension. To insure that subjects were responding to the number dimension rather than possible density or form attributes, a second experiment was performed. In Experiment 2 the same aged children learned the Experiment 1 task, with number-only relevant, and the learners were transferred to a much more difficult task with the same dimension still relevant. A control group learned the more difficult task only. All learners in the experimental group transferred successfully, but no subjects in the control group reached criterion. It was concluded that (a) subjects in Experiment 1 were responding to the number dimension and (b) if subjects can respond to the number dimension in a very simple task, they will transfer successfully to the same dimension in a task which is too difficult without the preswitch practice.

8. Holt, Michael. Maths for Tomorrow's Children. Mathematical Gazette, v54 n388, pp125-131, May 1970. EJ 028 656

*Concept Formation; *Instruction; *Learning; *Mathematical Concepts; Mathematics; Mathematics Materials

9. Immerzeel, George; Wiederanders, Donald. Ideas. Arithmetic Teacher, v18 n2, pp94-98, Feb 1971. EJ 033 644

*Arithmetic; *Instructional Materials; *Number Concepts; *Worksheets; Addition; Elementary School Mathematics; Multiplication

Mathematical worksheets are presented for use in the elementary school classroom. The sheets deal with arithmetic and number patterns, one being for the primary grades, the other for grades 4 to 8.

10. Kaprelian, George. Number Names. School Science and Mathematics, v71 n3, pp233-235, Mar 1971. EJ 036 912

    *Concept Formation; *Elementary School Mathematics; *Mathematics Education; *Numbers; *Number Systems; Vocabulary

11. O'Brien, Thomas C. Some Notes on Multiplication of Whole Numbers. Educational Studies in Mathematics, v3 n1, pp63-67, Sep 1970. EJ 033 609

    *Elementary School Mathematics; *Instruction; *Number Concepts; *Whole Numbers; Mathematics; Multiplication

12. Rea, Robert E.; Reys, Robert E. Mathematical Competencies of Entering Kindergarteners. Arithmetic Teacher, v17 n1, pp65-74, Jan 1970. EJ 013 953

    *Concept Formation; *Kindergarten; *Mathematical Experience; *Student Development; Elementary School Teachers; Elementary School Mathematics; Mathematics Education; Research; Teacher Education

    This study was conducted to evaluate the mathematical competencies of entering kindergarteners. Results indicated a wide range of variables influencing counting skills. There was also a strong relationship between the kindergartener's ability to rote and rational count.

2. Number Conservation Research

From Journal Literature (CIJE)

1. Anastasiow, Nicholas J.; And Others. A Comparison of Guided Discovery, Discovery and Didactic Teaching of Math to Kindergarten Poverty Children. American Educational Research Journal, v7 n4, pp493-510, Nov 1970. EJ 030 778

    *Discovery Learning; *Elementary School Mathematics; *Kindergarten Children; *Preschool Variables; Didacticism; Interaction Process Analysis; Negro Youth; Teaching Techniques

    The three teaching methods are not only compared, but predictors for matching students with techniques are investigated. Kindergarten

children learned mathematical principles under three conditions: discovery, guided discovery, and rule-example. Results indicated that rule-example may be most efficient for mastery of the content taught in early stages of the curriculum while guided discovery appeared more efficient for mastery of more complex principles. Proposes that effectiveness of discovery learning techniques may have resided in teacher behavior rather than in children's mastery of either process of content.

2. Callahan, LeRoy G.; Passi, Sneh Lata. The Relationship Between the Ability to Conserve Length and Conceptual Tempo. Journal for Research in Mathematics Education, v2 n1, pp36-43, Jan 1971. EJ 033 810

*Conservation; *Concept Formation; *Elementary School Mathmatics; *Geometric Concepts; *Mathematical Concepts; Grade One; Kindergarten; Learning

This study investigated the relationship between conservation of length and impulsive-reflectivity. Kindergarten and first-grade students were administered two conservation of length tasks and an impulsive-reflexive scale. No statistically significant relationship between the two concepts was found.

3. D'Mello, Sydney; Willemsen, Eleanor. The Development of the Number Concept: A Scalogram Analysis. Child Development, v40 n3, pp681-688, Sep 1969. EJ 008 190

*Abstraction Levels; *Number Concepts; *Mathematical Concepts; *Symbolic Learning; Preschool Children; Elementary School Students

Four tasks employing dominoes were hypothesized to represent increasing levels of abstraction in the use of number terms and presented to 38 subjects ranging from 3 to 8 years of age. Scalogram analysis was employed to test the hypothesized ordering. It was concluded that one task was misplaced in the ordering and the tasks were rearranged according to this empirically discovered order. It was concluded that the child first learns to recite number words in sequence; next to match visual arrays of similar objects according to visually perceived equality of quantity; then to match spoken number words to absolute quantity; and finally to match visual number symbols (numerals) with absolute quantity.

4. Mermelstein, Egon; Meyer, Edwina. Conservation Training Techniques and Their Effects on Different Populations. Child Development, v40 n2,

pp471-490, Jun 1969. EJ 006 379.

*Conservation (Concept); *Concept Formation; *Training Techniques; Cognitive Development; Learning Processes; Preschool Children; Conflict; Role Playing; Language Role

Ninty-six subjects from the Hofstra University Research Nursery School, 100 subjects from Project Head Start, and 220 subjects from neighborhood kindergartens were trained on Number Conservation using Cognitive Conflict (Smedslund); Verbal Rule Instruction (Beilin), Language Activation (Bruner), and Multiple Classification (Sigel) techniques. It was hypothesized that no one of the training techniques would be successful. Subjects were tested 3 weeks, 2 1/2 months, and 5 months after the last training session. Results indicate that the "Piagetian" concept of conservation was not induced by any of the training techniques, regardless of the population. Failure of conservation training techniques in general as well as methodological considerations are discussed.

5. Peters, Donald L. Verbal Mediators and Cue Discrimination in the Transition from Nonconservation to Conservation of Number. Child Development, v41 n3, pp707-721, Sep 1970. EJ 025 958

*Kindergarten Children; *Conservation (Concept); *Training Techniques; Cues; Visual Stimuli; Verbal Stimuli; Task Performance; Retention Studies; Language Role

The role of verbal mediators of comparison and cue discrimination in the transition from nonconservation to conservation of number was studied through the use of multiple regression techniques and an aptitude/treatment interaction (ATI) model. Four groups of kindergarten children were pretested on number, difference, and area conservation, as well as on comprehension of the language of comparisons and cognitive style. Three groups received either non-cued, visual cued, or verbal rule supplemented instruction. The fourth received no training. The results indicated the verbal training superior to the others on immediate learning, and both the verbal and visual cued treatments significantly better than the control on delayed retention. Both the language level and analytic sorting behavior of the subjects were found to be reliable predictors of number conservation performance. The ATI analyses suggests a compensatory notion of instruction with those subjects high in language comprehension benefiting most from visual cued training and analytic subjects benefiting most from the verbal training.

6. Rothenberg, Barbara B.; Orost, Jean H. The Training of Conservation of Number in Young Children. Child Development, v40 n3, pp707-726, Sep 1969. EJ 008 191

*Number Concepts; *Conservation (Concept); *Kindergarten Children; *Peer Teaching; *Sequential Approach; Training Techniques; Methods Research; Socioeconomic Background; Retention; Sex Differences

An approach to the training of conservation of number through the presentation of a logical sequence of component concepts or steps was evaluated in a series of 3 experiments using 130 kindergarten children. The subjects were given individual instruction by experimenters. In addition, part of the instruction was presented by slightly older conserving peers who acted as "assistant teachers." The experimental subjects showed significant growth in conservation while the control subjects showed no noticeable growth. The effects of the training were retained at 3 months and generalizability of these effects to conservation of discontinuous quantity was demonstrated. No sex differences were found and only slight differences were revealed in conservation learning between SES groups.

7. Stuck, Gary B.; Wyne, Marvin D. How Children Learn the Concept of Weight: S-R Training vs. Equilibration Training. Science Education, v54 n4, pp373-378, Oct/Dec 1970. EJ 030 315

*Concept Formation; *Conservation (Concept); *Elementary School Science; *Instruction; *Learning; Cognitive Processes; Scientific Concepts

Experiment compares the effect of equilibration type training to the effects of S-R reinforcement type training in developing weight-conservation concepts in second and third grade pupils. S-R group performed significantly better than control group on inital posttest for conservation of weight. A measure for permanence of the conservation beliefs did not differ significantly between experimental groups.

B. Practical Suggestions for Practitioners

From Journal Literature (CIJE)

1. Borgen, Jerome S.; Wood, John B. Yardstick Number-Line Balance. Arithmetic Teacher, v18 n3, pp184-185, Mar 1971. EJ 035 217

*Elementary School Mathematics; *Instructional Materials; *Manipulative Materials; *Number Concepts; Mathematics; *Mathematics Education; Teaching Techniques

2. Goldenberg, E. Paul. Scrutinizing Number Charts. Arithmetic Teacher, v17 n9, pp645-653, Dec 1970. EJ 031 271

*Charts; *Elementary School Mathematics; *Instruction; *Number Concepts; Audiovisual Aids; Arithmetic; Modern Mathematics; Numbers; Teaching Techniques

3. Hervey, Margaret A.; Litwiller, Bonnie H. A Graphical Representation of Multiples of the Whole Numbers. Arithmetic Teacher, v18 n1, pp47-48, Jan 1971. EJ 032 207

*Elementary School Mathematics; *Graphs; *Instruction; *Number Concepts; Teaching Techniques

4. Heard, Ida Mae. Number Games with Young Children. Young Children, v24 n3, pp147-150, Jan 1969. EJ 007 273

*Teaching Techniques; *Early Childhood Education; *Number Concepts; Educational Games; Elementary School Mathematics

This specialist in mathematics education at the elementary school level has found that finger puppets, listening for coins in a box, and spinner games are "teaching methods" which encourage young children to learn number and math concepts more easily than by rote memory and review.

5. Jarosh, Sharon C. The Number Line and Division. Arithmetic Teacher, v17 n7, pp617-618, Nov 1970. EJ 030 096

*Arithmetic; *Division; *Elementary School Mathematics; *Instruction; *Number Concepts; *Instructional Aids; Modern Mathematics; Teaching Techniques

6. Ogletree, Earl J.; And Others. Teaching Number Sense through Rhythmical Counting. Elementary School Journal, v71 n1, pp11-17, Oct 1970. EJ 028 717

*Number Concepts; *Language Rhythm; *Teaching Procedures; Learning; Arithmetic; Primary Grades

7. Schloff, Charles E. Double and Double Again. Arithmetic Teacher, v17 n7, pp613-614, Nov 1970. EJ 030 094

   *Elementary School Mathematics; *Instruction; *Number Concepts; *Numbers; Geometric Concepts; Teaching Techniques

8. Ziesche, Shirley S. Understanding Place Value. Arithmetic Teacher, v17 n9, pp683-684, Dec 1970. EJ 031 618

   *Elementary School Mathematics; *Instruction; *Number Concepts; *Teaching Techniques; Instructional Aids; Manipulative Materials; Numbers

C. Concept Research

   1. General Research

From Microfiche Collection (RIE)

1. Ginsberg, Rose. Investigation of Concept Learning in Young Children. Final Report. [69], 6p. ED 030 498

   *Concept Formation; *Concept Teaching; *Preschool Learning; *Learning Processes; Number Concepts; Preschool Children; Learning; Pictorial Stimuli; Transfer of Training; Teaching Methods

   Three experiments were conducted to investigate the learning of the concept "more than" by preschool children. In the first experiment, 48 nursery school children, ages 4 1/2 to 5 1/2 years, were divided into three groups. All were required to say which of two pictures contained the greater number of objects. In group one, circles were used as the objects in the picture; for group two, like objects were used in each pair, but the types of objects varied between pairs; and in group three, unlike objects were used in the pictures. For each group, 42 trials were conducted per day for 3 days or to a criterion of eight consecutive correct responses. Subjects in groups one and two who reached criterion were given the same procedure again, except with unlike objects (a transfer condition). The results showed that subjects who initially learned the concept with the simplest stimuli (group one) learned most efficiently. Experiment two substantially replicated the results of experiment one, using children 41 to 51 months of age. Experiment three did likewise, using children with a mean age of 38 months. The overall results indicated that concept learning in young children was most efficient when the concept was introduced in the simplest context.

2. Martorella, Peter H.; Wood, Roger. The Effects of Extraneous Material and Negative Exemplars on a Social Science Concept-Learning Task for Pre-School Children. Feb 71, 7p. ED 047 819

*Social Sciences; *Concept Formation; *Learning; *Instructional Materials; *Audiovisual Aids; Analysis of Variance; Kindergarten Children; Reinforcement

This study analyzes the relative effects of two categories of variables upon the learning of a basic social science concept by a kindergarten population. Major hypotheses were: (1) Subjects receiving treatments with low degrees of irrelevant material would score significantly higher on concept-learning measures related to the task than those receiving treatments with medium and high degrees of irrelevant data, (2) subjects receiving treatments with the greater number of negative exemplars would score significantly higher on concept-learning measures than those receiving lesser numbers, (3) subjects receiving treatments with the greater number of negative exemplars would have an interaction effect upon learning measures. Subjects were 789,225 kindergarten children representing a cross section of Seattle's population, according to SES data. Teaching materials were cassette recordings manually synchronized with 2x2 colored slides of concept examplars and nonexemplars shown on a slide projector. The concept "island" was taught to children in groups of two and three, and three critical attributes were delineated. Analysis of variance indicated no significant differences. The study seems to suggest that for preschool children increasing irrelevant dimensions and reducing contrast in a social science concept-learning task are not significant factors.

3. Meyer, William J.; Hultsch, David. Concept Identification Strategies. Research Project Number 3 of Project Head Start Research and Evaluation Center, Syracuse University Research Institute. Final Report, November 1, 1967. Nov 67, 24p. ED 026 140

*Concept Formation; *Age Differences; *Memory; *Interaction; *Complexity Level; Kindergarten Children; Grade 2; Cognitive Processes; Cognitive Development; Information Theory; Stimulus Generalization

The purpose of this study was to determine the effects of age differences and differences in memory load on concept identification (CI) tasks of varying levels of complexity. Previous studies with young children found increasingly better performance on CI tasks with increasing age. This was in part due to the fact that older subjects categorize stimulus information to a greater extent than younger subjects. Perhaps a reduction of the memory load required in the task would benefit the younger children more than the older children, because it would reduce the irrelevant

stimulus dimensions of the task which bother younger children. The subjects for this study were 54 kindergarten and 54 second grade children. They were administered CI tasks of three levels of complexity and three levels of memory load. The results from the subjects' performances on these tasks indicated that the younger children were more adversely affected by increased concept complexity than the older children. No significant age-memory load interaction occurred.

4. Pollak, Ruth S. Guide for RIPPLES. 70, 34p. ED 051 872

*Educational Television; *Television Curriculum; *Teacher Role; *Program Guides; *Elementary School Students; Concept Formation; Physical Environment; Human Relations; Program Descriptions

The "Ripples" series of educational television programs for children from 5 to 7 years old is described in this guide. The programs present basic ideas about man in relation to himself and his environment, leading the child into many subject areas and stimulating curiosity about himself and the wider world. The information presented in this guide is planned to help teachers use 36 different "Ripples" programs effectively and includes program description, basic emphasis, and suggestions for further activities for each program. When specific preparations are desirable, these are also mentioned. The "Ripples" television approach is different in that it departs from traditional subject matter and emphasizes the importance of the teacher role in later discussion and activities. The programs are planned to reinforce each other by approaching the same ideas from different points of view. For example, the idea that children can cope with new situations is dealt with in several ways in these programs: "Everybody's Different," "All by Myself, How Do you Know?, Overnight at the Hospital, and Lost."

5. Problem Solving and Concept Formation: Annotated Listing of National and International Curricular Projects at the Early Childhood Level. Jun 68, 17p. ED 029 685

*Early Childhood Education; *Annotated Bibliographies; *Research Projects; *Science Education; *Mathematics Education; Problem Solving; Concept Formation; Curriculum Development; Foreign Countries; National Surveys

This document is an annotated listing of national and international curricular projects concerned with problem solving and concept formation at the early childhood level. It contains 50 citations.

6. Schwab, Lynne; Stern, Carolyn. Effect of Variety on the Learning of a Social Studies Concept by Preschool Children. Feb 69, 11p. ED 029 690

*Transfer of Training; *Learning Processes; *Preschool Children; *Concept Teaching; Cognitive Development; Pictorial Stimuli; Classification; Social Studies

Fifty-four 5-year-old Head Start children participated in a study of the effect of varied versus repeated training on the development of the ability to categorize and transfer learning. The children were grouped according to chronological age and results of a mastery test and the Peabody Picture Vocabulary Test. Work categories translated into single verbs, such as "sell" or "clean," were used in an instructional pattern involving two frames. The first frame contained a single stimulus picture of a specific kind of worker, and the second frame contained three pictures of different kinds of workers. After commentary, the children were asked to match the worker in frame one with the worker who was doing the same kind of work in frame two. Different instructional treatments involved number and variety of instances presented in these matching-to-sample tests. When the children's results on mastery, near-transfer, and far-transfer tests were compared, it was found that if the number of categories were held constant and if the instances were either varied or repeated, the children trained with greater variety rather than greater repetition were superior on the transfer to new instances test. There were no significant differences among groups on the other measures.

7. Towler, John O. A Study of the Development of Egocentrism and the Coordination of Spatial Perceptions in Elementary School Children. Final Report. Dec 69, 39p. ED 050 829

*Self Concept; *Space Orientation; *Perception; *Concept Formation; Rural Environment; Socioeconomic Status; Tables (Data); Age; Elementary School Students; Intellectual Development; Urban Environment

This study developed from the hypotheses: (1) there is a sequential pattern in the development of children's abilities to coordinate perspectives, and (2) use of an urban environment in the Test of Coordination of Perspectives will result in an earlier development of the age-stage relationships tested by Piaget and Inhelder (Switzerland, 1963). Statistically tested hypotheses were: (1) there are significant correlations between the ability to coordinate perspectives and chronological age, intelligence, socioeconomic status, and knowledge of left-right relationships; and (2) there is a significant difference in the mean scores of high and low socioeconomic groups on the Test of Coordination of Perspectives when the effect of intelligence is removed, and also a difference between subjects living in urban as opposed

to rural environments on the same test. The study involved the administration of an intelligence test, a test of right-left relationships and the Test of Coordination of Perspectives to 140 children from kindergarten to grade six, 5.0 to 12.7 years of age, enrolled in two schools reflecting high and low socioeconomic classes, rural and urban environments. Results proved hypothesis 1 acceptable; 2 was not. The finding that there are differences in the developmental stages of children of the same age but with different IQs indicates that Piaget's age-stage relationships may be more closely allied to intelligence than to maturation and experience.

8. Ward, Edna M. A Study of Causal Thinking in Elementary School Children. Final Report. Jun 70, 123p. ED 050 830

*Thought Processes; *Concept Formation; *Cognitive Processes; *Cross Cultural Studies; *Mental Development; Elementary School Students; Instructional Program Divisions; Intelligence Quotient; Age Difference; Sex Differences

This study, which is a partial replication and validation of the 1962 Laurendeau and Pinard study of causal thinking, investigates cross-cultural differences among three age levels of Canadian and American school children in the development of causal thinking. Also studied is the relationship between level of development of causal thinking and variables of age, sex, IQ, and grade placement. Seventy-five boys and 75 girls, ages 6, 8, and 11 years, were administered the Laurendeau and Pinard questionnaires (included in appendixes) to elicit responses about concepts of dream, life, the origin of night, the movement of clouds, and the floating and sinking of objects. Responses were evaluated for instances of precausal thinking, i.e. realism, animism, artificialism, finalism, and dynamism. Analyses of the data support the Piaget (1927) and the Laurendeau and Pinard (1962) findings with regard to the three age-related stages of development of causal thinking, and the manifestation of precausal forms of thinking. Significant differences appear for the dimensions of age and school grade for the American subjects. Significant differences between Canadian and American children are found in level of development attained in all the concepts, exception the concept of life.

From Journal Literature (CIJE)

1. Buser, Robert L.; Rooze, Gene E. Learning: The Role of Facts and Generalizations. Elementary School Journal, v71 n3, pp129-133, Dec 1970. EJ 028 638

*Concept Formation; *Learning; *Generalization; Information Seeking; Skill Development; Teaching Techniques

2. Hollenberg, Clementina Kuhlman. Functions of Visual Imagery in the Learning and Concept Formation of Children. Child Development, v41 n4, pp1003-1015, Dec 1970. EJ 033 779

*Language Development; *Paired Associate Learning; *Visualization; *Elementary School Students; *Concept Formation; Analysis of Variance; Tables (Data); Learning Process; Age Differences

3. Read, Charles. Pre-School Children's Knowledge of English Phonology. Harvard Educational Review, v41 n1, pp1-34, Feb 1971. EJ 033 686

*Preschool Children; *Phonology; *English; *Concept Formation; *Thought Processes; Spelling; Hypothesis Testing; Language Learning; Vowels; Consonants

4. Robinett, Ralph F. An Interdisciplinary Approach to Oral Language and Conceptual Development: A Progress Report. Elementary English, v48 n4, pp203-208, Apr 1971. EJ 036 725

*Spanish Speaking; *English (Second Language); *Interdisciplinary Approach; *Concept Formation; *Oral Communication; Grade 1; Language Development; Learning Activities; Bilingual Education

A report on "Interdisciplinary Oral Language Guide: Primary One" developed by the Michigan Department of Education.

5. Stephens, Lois; Dutton, Wilbur H. The Development of Time Concepts by Kindergarten Children. School Science and Mathematics, v69 n1, pp59-63. Jan 1969. EJ 001 176

*Concept Formation; *Elementary School Science; *Instruction; *Scientific Concepts; Cognitive Processes; Kindergarten; Physical Sciences

The purpose of this study was to determine the capacity of children of kindergarten age of varying abilities to develop mathematical concepts relating to telling time. Results showed that kindergarten children can develop more concepts of telling time when these concepts are presented in a planned program in instruction in addition to the incidental teaching than when they are presented only incidentally. Recommends a planned program of instruction for teaching concepts of time.

2. Concepts and the Disadvantaged Child

From Microfiche Collection (RIE)

1. Locatis, Craig; Smith, Frank A. Performance of Kindergarten Children From Low Income Families on Selected Concept Categories. Mar 69, 7p. ED 028 847

   *Kindergarten Children; *Low Income Groups; *Concept Formation; *Test Construction; *Preschool Tests; Classification; Conceptual Schemes; Pictorial Stimuli

   Some 180 kindergarten children from low income families were tested midway through the school year on an instructional concepts inventory created by the Southwest Regional Laboratory for Educational Research and Development (SRL). The inventory was designed to measure the basic concepts known by a child. It is specifically geared to test kindergarten pupils for their skill with concepts necessary for successful achievement in the first grade. The inventory draws from a list of 86 concepts grouped into seven categories: color, size, shape, position, amount, time and equivalence. The inventory, as used in this study, had 36 items involving the seven categories. Each item consisted of a picture illustration of a concept and two distractors. Each child tested was asked to point to the illustration of the concept named by the examiner. The test results showed that, on an average, the subjects knew about 23 of the 36 concepts. The results indicated that kindergarten children from low income families needed instruction in the basic concepts. SRL is developing a program to teach the basic concepts measured by this inventory.

2. Schutz, Samuel. Rule and Attribute Learning in the Use and Identification of Concepts with Young Disadvantaged Children. [69], 63p. ED 040 747

   *Concept Teaching; *Concept Formation; *Learning Processes; Cognitive Development; Preschool Children; Logic; Definitions; Generalization; Culturally Disadvantaged; Knowledge Level; Inductive Methods

   This study assessed the value of teaching young children the relevant attributes of a concept and the conceptual rule by which the attributes are organized. It was hypothesized that only if children had prior knowledge of both components could they follow instructions designed to teach a new concept. It was further hypothesized that children who learned to follow instructions involving a new rule would be superior at discovering this rule in a concept identification or inductive learning problem. Sixty Head Start 4-year-olds who could follow directions but did not know the

components to be taught were randomly assigned to 1 of 4 treatment groups: (1) learned the new rule, (2) learned new attributes, (3) learned both rule and attributes, and (4) control. Results of pre- and posttests on concept utilization and concept identification indicated that the experimental groups performed better than the control group if and only if the children had learned both components before and during the experiment. Transfer of the new rule to the concept identification problem was demonstrated for the Rule Learning group, but not for the Rule and Attribute Learning group.

Additional References

For additional information that relates to each of the categories considered, the reader may refer to:

Number research

A. General research:
ED 006 700
ED 018 199
ED 025 969

B. Research relating to number conservation:
ED 021 752
ED 025 957
ED 028 822
ED 031 297
ED 036 334
ED 036 355
ED 039 934
ED 047 801
EJ 002 864
EJ 006 377
EJ 016 437
ED 025 957
ED 047 801

Practical suggestions for practitioners relating to development of number:
ED 039 168

Concept research:

A. Research relating to disadvantaged preschool children:
ED 021 608
ED 042 508

B. General research on concept development:
ED 035 953
ED 037 231
ED 046 499
EJ 006 386
EJ 008 147
EJ 012 584
EJ 015 100
EJ 021 773

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